

16PL204**DRILLING FLUIDS AND
CEMENTING TECHNOLOGY**

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	15	-	25	50	-	-	5	5

Course Description and Objectives:

This course covers all drilling fluids technology concepts like drilling fluid selection, passing through the mud types, properties and hydraulics that are compatible with formation type & pore pressure, determination of drilling problems related to mud. Finally, drilling fluid separation and its environmental issue. The objective of this course is to provide the required practical knowledge and procedures for performing good cementing Job and also to achieve the successful Well construction Target..

Course Outcomes:

The student will be able to :

- understand the procedure to plan and design a basic well construction scheme.
- understand well control techniques.
- become acquainted with drilling rigs and drilling operations.

SKILLS:

- ✓ *Acquire a thorough knowledge of drilling fluids and rheology.*
- ✓ *Choose the right equipment for solid removal.*
- ✓ *Communicate efficiently with a drilling fluid specialist.*

UNIT - 1

L-9

Drilling Fluids: Overview of drilling fluids, clay chemistry and its application to drilling fluids, types of clays, hydration, flocculation, aggregation and dispersion. Classification, types and applications of drilling fluids: Water based, oil based, emulsion based, polymer based, surfactant based, foam based and aerated drilling fluids. Criteria of selection of drilling fluid additives and salinity of drilling fluids.

UNIT - 2

L-9

Drilling Fluid Characteristics: Basic functions, properties, maintenance and treatments of drilling fluids. Drilling fluid requirement calculations. Role of formation pressure, mineralogy & petrology in designing drilling fluid. Rock texture and its relation with drilling fluids. Design of technology specific drilling fluids for, environmentally sensitive areas, horizontal/ERD wells, HP-HT wells and depleted Reservoirs.

UNIT - 3

L-9

Cements: Cementing, cements & cement slurry: objectives of cementing, oil well cements. Classification of cement, slurry design, slurry additives, factors influencing cement slurry design. Cementing equipment. Factors influencing cement rise behind casing and its bridging with rock and casing.

UNIT - 4

L-9

Cement formulation and testing: Testing and performance evaluation of cement and cement additives, slurries for casing cementation Formulation/Design of cement slurries for low temperature areas, loss prone areas, depleted reservoirs, and quality control of cementing process.

UNIT - 5

L-9

Cementing Methods: Primary cementing, stage cementing, liner cementing, plugging, squeeze cementing techniques in practice. Deep well cementing, squeeze jobs, prevention of gas channeling, HT-HP environments, analysis and techniques of evaluation of cement job. Characteristics of good quality cementation. Cementing Calculations.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

Total Hours-30

1. Measurement of mud weight
2. Measurement of mud density
3. Measurement of mud plastic viscosity.
4. XRD studies of types of clay
5. Measurement of gel strength
6. Determination of filtration loss
7. Determination of Sand content
8. Determination of consistency of cement slurry.
9. Determination of the setting points of the cement based slurries.

TEXT BOOKS:

1. H. Rabia, "Well Engineering and Construction", paperback, 2001.
2. Erik B Nelson, Dominique Guillot, "Well cementing", 2nd edition, Sugar Land, 2006

REFERENCE BOOKS:

1. G. V. Chilingarian and P.Vorabutr, "Drilling and Drilling Fluids (Developments in Petroleum Science)", Elsevier Scientific Publishing Co., 1981.

Significance of waste management in drilling operations processes used for controlling and disposing of drilled cuttings such as land farming, annular injection, and offshore requirements. Drilling fluid toxicity and testing. Toxic components in drilling fluid. The international recommendations for handling non-aqueous fluids are also covered.